National Report on STEAM curriculum

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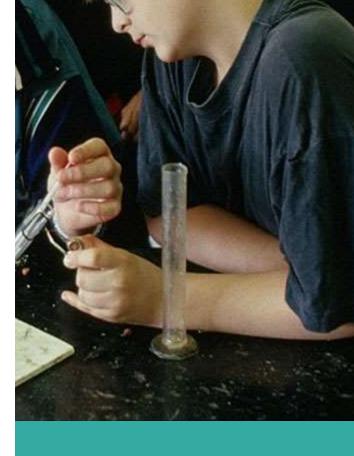# TABLE OF CONTENTS

1- How is STEAM taught in France ?

A. Is STEAM curriculum integrated in formal education in my country? And how?

There is no mention of STEAM skills in the whole French curriculum in high school. Each discipline has its own curriculum, which is defined by the Ministère de l'Education Nationale and is valid for the entire, with very little cross-disciplinary contents in the curricula. The following examples show that some skills can be considered in several disciplines as STEAM skills, but they are never specifically identified as STEAM skills.

STEAM skills in the French curriculum for high schools	
Discipline	**Skills**
Mathematics	- research, experimentation - producing data models - using mathematics languages and different models of visualisation - demonstration and reasoning skills - calculation - communicating the demonstration and the results
Economic and social sciences, History and Geography	- building a demonstration, developing reasoning skills based on disciplinary knowledge and on documents' analytical study - language skills, both written and verbal
Numerical and digital Sciences	- using digital datas and several numerical languages - analysis of new digital practices and habits ; workshops on their consequences on societies, individuals, on arts and other disciplines - oral and written argumentation
Education to medias and information resources	- developing research and analysis skills - using several information and documentation tools - developing personal curiosity - oral and written argumentation - abilities to participate to workshops

B. Is it only in/non-formal education?

French curricula indicate however cross-skills which can be taught in every discipline.

These transverse skills include information search, written and verbal argumentation, problem solving, oral presentations, group work, documents analysis, building of critical thinking.

In France, STEAM skills are part of informal education. They can be taught through the implementation of interdisciplinary projects, which are driven within each school by the teaching teams. This type of project depends on the will of the teaching and managing teams : these projects have to be organised with specific schedules and payment plans for the teachers, because they are not part of the ministerial curricula.

Traditionally and culturally in the French education system, teachers aren't used to be part of a team, especially in secondary schools : French teachers in high school are supposed to teach their lessons, to participate to the life of the class (meetings with the families, teacher's conferences) ; but transdisciplinary and cross-disciplinary lessons are not part of the curricula and of the teaching culture in high school. Besides, there is no time set aside in timetables to bring teams together, nor is there often any space in the schools, such as meeting rooms. It is therefore often difficult to build interdisciplinary projects for these reasons. And the success of such projects depends only on the motivation of the supporting teachers and the support of the school management.

2- Example(s) of good practice that can be shared

Within Lycée Louis Jouvet - Taverny, several teachers are driving transdisciplinary projects since a few years, which mobilize some STEAM skills in an informal way. In our school, there is a specific project culture. Not all projects are based on STEAM skills, but this dynamic is quite particular in the French educational landscape. It is due to self motivated teachers and committed managing teams.

We have projects around the implementation of contributions from research in cognitive sciences, European dynamics and we won a call for projects with the French space agency (CNES). This allowed students to build scientific experiments and to test them directly in weightlessness.

As a specific example, we can present the "**Digital project**" which has been lead for 4 years by a biology and natural sciences teacher and a history and geography teacher :

- **Public** : a dozen of pupils between 14 and 15 ("classe de 2nde" : 1st grade in high school), split into small groups.
- **Aim** : building a video game and a webpage on the theme of "Discovery of the so called "New World" and scientific discoveries" ; all of the contents are written and presented in English.
- **Organisation** : each groupe works on a character related to the theme (an important scientist, a sailor) and presents a short biography after a few researches on the internet (using institutional websites such as Museum's web pages or the French National Library - Bibliothèque Nationale de France). After the oral presentation, the groups vote for the most convincing character they will work on the entire scholar year.
  The groups work on the chosen character with an internal organisation, within each group is responsible for 1 topic : 1 group for the researches, controlling the relevance of the informations gathered by other groups about the character and his time ; 1 group for the game design ; 1 group for the web design ; 1 group for the schedule.
  Each group works on every part of the project (researches, game and web design), but each group is a point of contact for 1 topic.
- During the scholar year : the entire class group presents the website and the game during the "Journée Portes ouvertes" (open school day) to other pupils, in march. At the end of the year, the links to the website and the game are shared on the school's website.

During the **Digital project**, the following STEAM skills have been improved :

- research abilities to choose the character and to collect some datas
- work on historical and scientific contents, linked to the history, geography and natural sciences curricula
- developing the personal curiosity with new ways for research and documentation, linked to scientific contents which have been studied during class lessons
- innovation skills to create some digital contents and to present the character's life on numeric supports such as the web page and the video game
- experimentations with digital tools : BYOT initiatives and use of digital tools such as management and game softwares, online resources and web design
- coworking and brainstorming with oral presentations and written contents
- increasing the pupils' autonomy with the task's management
- work on languages' skills, both written and oral

3- A SWOT analysis of one good practice

Action : creation of social solidarity economy enterprises in the classroom.

The **objective** of this action is to empower students by making them actors in an entrepreneurial, collective and socially useful project.

Through the creation of an association, a cooperative or a mutual fund, the students can develop many skills. They can also appropriate and give meaning to the values of equality, cooperation and solidarity.

This experience allows students to understand the economic and professional world around them, within sight of their academic and professional orientation.

Examples of project 2019-2020 :

- *Association creating a downloadable escape game for hospitalized children*
- *Association raising awareness of urban pollution among primary school children*
- *Association promoting sports competitions to collect donations in favour of battered and excised women in Africa*

	Helpful *to achieve the project*	Harmful *to achieve the project*
Internal origin *(attributes of the organization)*	**STRENGTHS** **Motivation :** students create their own structure around projects that makes sense to them. They are motivated to spend time on their project. **Responsability :** each student within the company must take on responsibilities. They choose a president, a treasurer, a secretary, a communication manager, etc. Everyone has things to do for the project. Decisions are taken collectively within the fictitious company. **Interdisciplinarity :** all the teachers in the teaching team can intervene at different times during the project, according to their expertise. **Development of many skills :** based on an initial observation, they must devise innovative and solidarity responses based on cooperation and social utility. They must then create a company : either an association, a cooperative or a mutual. As a result, they develop both STEAM skills and social-behavioural skills.	**WEAKNESSES** **Training :** it is not easy for teaching teams to supervise such projects. It takes time to support students and help them build their projects. Teachers are not trained for this. Sometimes it can be improvised. **Financing :** some projects require money. It is therefore necessary to convince the institution to participate in the financing of projects, which is not easy because budgets are tight. As a result, students have to look for sponsors to help them, with the possibility of finding nothing.
External origin *(attributes of the environment)*	**OPPORTUNITIES** **Partnership :** there is a national association whose objective is to promote the social and solidarity economy in education. There are correspondents in each academy to help teachers set up projects. Their intervention is free of charge.	**THREATS** **Time slot :** no time slot in the programs. It depends a lot on the goodwill of the headteacher. **Teacher remuneration :** no official remuneration, it depends on the goodwill of the headteacher.